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INTRODUCTORY LECTURE

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Mister President Dear Professor UCHIDA,
Ladies and Gentlemen,
Shinainaru Minasan, Dear Friends,

Last year, when I was able to spend a scientific stay here at Seto, one day at the end of August was a very remarkable one. Remarkable for me, first because the typhoon No. 23 was approaching this region with heavy storm and rain, exposing me for the second time in a fortnight to this tremendous but necessary power of nature. But that day was even more remarkable because Professors UCHIDA, UTINOMI and TOKIOKA were discussing the problems concerned with the idea of holding a symposium at Seto. Fortunately, they came unanimously to the final conclusion to agree, and to invite coelenterate biologists from all over the world. Considering also the personal responsibilities, there was also unanimity that Dr. Taku KOMAI, Professor Emeritus of Kyoto University, should be the honorary president of the planned symposium. Because of his age of 85 years his chances to participate personally were not thought to be very high. But several days later, at the beginning of September, I had for the second time the great honor and privilege to see him in his house in Kyoto. Like two years ago I found him well and in good health. Again I was fascinated by his broad mind, by his strong interest in general biology and the special fields of marine biology we discussed, and I was impressed very much also by his extraordinary personality and goodness.

Unfortunately, Professor Taku KOMAI passed away last summer, now 4 months ago. The Japanese and more, all the zoologists of the world, lost with him one of the last living grand old men who laid the foundation of the modern biology some 50 years ago. It was KOMAI who actually founded in 1922 the Seto Marine Biological Laboratory which is now our host for this symposium. It was in 1923 that KOMAI started in the United States his studies in the field of genetics as a student of the famous Thomas Hunt MORGAN. So KOMAI was one of the first scientists to open the door in this country to the most important field of genetic research. I am very glad to possess a small paper, which is one of the most appreciated in my collection of reprints, in which KOMAI gives a very pleasant and interesting report about the old times when he shared a small room, the famous "Fly Room", with MORGAN and three other scientists all working on *Drosophila*. Our Japanese colleagues know much better the importance of KOMAI for the improvement and progress of general and special zoology and marine biology in Japan as he was a famous scientist through his excellent papers.

Famous he was also as a teacher of numerous generations of students and of several generations of leading zoologists who are still alive and active. KOMAI continued to publish important papers in his high age, particularly in the fields of his definite interest, for instance in human genetics. In June 1972, some days before he died, he published his last paper, a small note in "Science". With this paper he made reference to the recent work of the Emperor HIROHITO and to the scientific activity of the Imperial laboratory. To call special attention to the work of KOMAI, which is of particular interest to coelenterate biologists, one must mention the papers on morphology, systematics and life history of Scyphozoa and Ctenophora. May I add the personal note that I have been connected with the work of KOMAI, as I was able to follow his steps in the observations on a peculiar scyphozoan polyp, *Stephanoscyphus racemosus* KOMAI which is endemic to Japan and this region. I shall return to this species in my special paper. KOMAI appreciated very much the idea of holding this symposium in Japan and he supported it actively by a financial donation shortly before he died. So I do hope that you will agree that the volume of the proceedings of this symposium should be dedicated to Taku KOMAI, and that an obituary note on his life and work should be included.

The international family of coelenterate biologists has lost during the last few years three other famous zoologists, Professor C.F.A. PANTIN, Zoological Department of Cambridge University, England, Professor Thomas GOREAUX, University of West Indies, Jamaica, and Dr. William J. REES, Museum of Natural History, London. The great contributions of these scientists to the progress of the systematics, evolution, physiology and ecology of the several groups of coelenterates are well known to all of us. They gave us the standards in modern coelenterate research and it is for us to follow them to the best of our ability. Let us stand one minute in honor and memory of KOMAI, PANTIN, GOREAUX and REES. Thank you.

From the invitations and announcements of this symposium, which seems to be the first truly international symposium on coelenterate biology, it is well known that we as the participants are indebted very much to the committee and to the actual organizers, first of all to Professor UCHIDA, the president who made the final decision, then to Professor UTINOMI, director of the Seto Marine Biological Laboratory and our host, furthermore to Professor HIRAI, Asamushi Marine Biological Station, who has acted as a good spiritus rector with his support and advice. Particularly we are obliged very much to Professor TOKIOKA, Seto Marine Biological Laboratory, who was the excellent organizer. If this symposium is so well planned in the whole and in the details, it is thanks to the merits of Professor TOKIOKA. He has undertaken enormous efforts to make a good program, to contact personally the authorities for financial support, to provide rooms and accommodation for the participants. If we have succeeded to come safely to Seto from foreign countries we have to thank particularly for the excellent travel advices, which we could follow confidently. So we could feel as the crew of a ship which followed the calming light of a lighthouse in the dark night.

Really, Professor TOKIOKA has acted as our lighthouse in the night of the long travel, but after every night comes the clear day, and now we are glad to have reached the country of the rising sun. The Japanese sun will give us warmth and light for several days.

In our best thanks we must include also all other members of the staff of Seto Marine Laboratory and the staff of Sabiura Research Station of the Marine Parks Center. They had to work very hard and they did their best to prepare all necessary arrangements and to make this symposium effective and successful by their combined efforts.

Special attention must be made to that this symposium has found also the supporting interest and generous financial help of His Majesty the Emperor HIROHITO of Japan. Perhaps there will be the possibility to send a message to His Majesty in order to express the respectful thanks of all of us.

Furthermore for donations, we owe much to Mr. OOHASHI, the governor of Wakayama Prefecture; Messrs. KOYAMA and TAYA in Tanabe, Messrs. ONODERA, HIROZAWA and others in Shirahama, Dr. NISHIZUME and his group in Himeji, Fishermen's Union of Shirahama, Shirahama Rotary Club, Shirahama Hot-spring and Real Estate Company and some others. The president MAEDA and his staff of Koganoi Hotel have so kindly afforded us every facility for holding the meeting in this hotel. Especially the town of Shirahama has decided so generously to hold a reception to welcome us. We wish earnestly to express our hearty thanks for these in this moment, though the details of them will be exactly published in the proceedings of the symposium.

Ladies and Gentlemen, I believe that there is no need to give a detailed explanation why a symposium like this has been planned. The fact that you have followed the invitation and that you have come from 10 different countries speaks for itself and confirms your belief that a work meeting is necessary from time to time for the personal relations and contacts and also for the exchange of knowledge and experience. The personal feeling which leads to the decision to attend a symposium may be first simply the wish to see and contact unknown colleagues who are well known but only by exchange of letters and papers. If one is studying a paper carefully, a point will be often reached of which the reader has a silent discussion with the writer, and it is quite natural that the reader becomes inquisitive and wants to know the person who is hidden behind the scientific work.

Furthermore, in the present time with its enormous explosion of knowledge and new facts in basic and applied research, the single poor scientist is every time in the danger of losing the survey even of closely related fields of sciences. On the other hand, he must restrict himself to a small field of his activity in order to stand in the forefront of new research. Therefore, the scientist must be at any time conscious of the danger of becoming one-sided and narrow-minded. At home we have the bitter sentence of the specialist who knows more and more about fewer and fewer things,

so that he finally knows all of nearly nothing. This bitter sentence is, of course, very much exaggerated but it contains a grain of truth. A meeting can help as a welcome means to avoid the danger in question. This was the reason that the initiators of this symposium decided not to restrict to a special field of coelenterate biology but instead to try to cover with the topics a broader spectrum and to touch the essential fields in the actual biological research of coelenterates. Of course, there is no possibility to cover all important aspects but thanks to your active reaction a many-sided and very promising program has been made, which includes representative fields of the modern coelenterate research.

To speak of recent trends implies the question what of the trends in the past. There is no time and need to go too far back to the old days in which the influence of the revolutionary theory of DARWIN led to the well known efforts to study the morphology, anatomy, developmental history and systematics of the marine invertebrates with the main aim to elucidate the steps of evolution. It is also generally known that the Coelenterata as the lowest group of Metazoa have attracted every time the special interest of zoologists. As a result there exist several theories and hypotheses of the role which the Coelenterata have played from the viewpoint of phylogeny. The modern aspect of coelenterate research may be characterized by the tendency for attention to be focussed on the whole living animal with all its activities. Thus the physiology, behaviour and ecology have become the important fields of research as in the other groups of invertebrates. The modern techniques particularly in electrophysiology, the techniques of electron microscopy have provided the means to investigate the neural basis and moreover the fine structures and processes at the cell level.

It seems me not useless to lead your interest to the earlier symposia on coelenterate biology. The first symposium was held in March 1961 in the United States at Coral Gables under the title: "Physiology and Ultrastructure of *Hydra* and of Some Other Coelenterates." The second symposium was held also in the United States, in December 1964 at the Knoxville Meeting of the American Society of Zoologists with the title: "Behavioral Physiology of Coelenterates". The organizer of this second symposium was Professor PASSANO; we are very glad to see him here today. He gave an excellent introductory lecture to the mentioned symposium in which he pointed to the reasons why the Coelenterata represent an important and interesting group to be studied. So it was not necessary for me to deal with the question why study coelenterates at all. Short time later another symposium was held, in March 1965, in London by the Zoological Society under the title "The Cnidaria and their Evolution". At this point I should like to mention that two of you, Professors MACKIE and ROSS, can celebrate a jubilee as they have attended all three symposia.

Considering and evaluating the topics of the three symposia could give an interesting picture on the trends in coelenterate research of the last 10 years. But there is no time to go into detail. I should like to mention only that there has been an interesting change in the role which the several groups of coelenterates played in the

papers presented. Whereas the first meeting dealt almost exclusively with *Hydra*, in the two following symposia appeared more and more the other Hydrozoa and also the Scyphozoa and Anthozoa. There has been a corresponding change also with regard to the topics. In the first two symposia particularly problems of physiology, ecology and fine structure were dealt with. The third symposium on evolution included also the fields of morphology and systematics. Because morphology, development and systematics are the necessary solid basis for all other disciplines of physiology and ecology this sort of research work must be considered to be of fundamental importance also today and must not be neglected. With regard to this point, I want to call special attention to the successful work and to the enormous progress made in the fields of morphology, systematics and life history of coelenterates here in Japan during the last 30–40 years. This work is connected particularly with the name of Prof. UCHIDA.

From my own, of course, only restricted experience and personal viewpoint I should like to add some points of general interest which may have also consequences for the future.

First of all, it seems of importance that most new results even on morphology, life history, systematics and evolution are obtained not by the investigations of preserved material, but by observations on the living animals reared in the laboratory. Unlike most other groups of marine invertebrates which are difficult to rear in the laboratory, the coelenterates offer the great advantage that they can be fairly easily reared for a long time and in some cases over the complete life cycle. So they offer themselves as suitable objects for experimental analysis. And this is true not only for the specialized freshwater-Hydras but also for the more basic groups of marine hydroids, and moreover for the Scyphozoa and Anthozoa. What do you think about the idea that there should exist a central laboratory in which a good number of suitable coelenterate species could be reared for experimental purposes and from which scientists all over the world could obtain the living objects needed? There are no principal and no practical difficulties to distribute living material to all points of the world by air mail. With respect to this point, I want to call your attention to the fact that coelenterates are excellent objects for the experimental study of the influence of noxious substances in the surrounding medium. The first investigations in this direction have shown some hydroids to be very sensitive as the medium contacts the inner and outer surfaces of the body. Furthermore they multiply quickly by asexual reproduction and offer the great advantage that the stocks and clones are of genetic uniformity. There is no doubt that some pollution problems can be solved using hydroids as test objects. As you know, pollution is now a big scientific problem and perhaps the research of coelenterate biology can contribute and advance under this aspect.

Furthermore, it seems that the modern means of SCUBA diving could also be an advantage in the study of behaviour and ecology of coelenterates. Participating some weeks ago in an international meeting which was held under the title "Man in the Sea" at Helgoland, I learned some interesting results on life cycles and behaviour of hy-

droids, sea anemones and sessile Ctenophora which were obtained by SCUBA diving.

Finally, I should like to call attention to a special problem which is from my own experience and interest one of the most fascinating problems. It is of importance that the coelenterates as a low group of invertebrates are influenced by environmental conditions to a particular high degree. Essential phases and processes of life depend on environmental factors for instance on temperature. In some fairly well analysed cases it was shown that seasonal occurrence and geographical distribution of a species can be explained sufficiently by the temperature requirements of polyps and medusae. The seasonal occurrence of medusae in the plankton depends on the process of budding in the polyp. Therefore this process which is important for the existence of the species must be initiated and regulated by the temperature. It has been shown that in the medusa of the hydroid *Rathkea octopunctata* the same embryonic cell material can change into somatic cells or germ cells in different ranges of temperature. In other species the same material of an undifferentiated bud can develop into a polyp or into a medusa again by the influence of different temperatures. So it is true that an external factor can have in hydroids really a well marked organizer-effect. With the modern techniques of biochemistry it should be possible to elucidate the relevant processes on the cell level and the supposed changes of the enzymatic systems. Thus this fascinating problem which is important from the point of developmental biology, and which is also important for the morphogenesis, ecology and biogeography should be solved in the future.

Ladies and Gentlemen!

We are living in a quickly changing world which is full of unrest. Nobody knows to which end the modern techniques will lead us, to damage or to real progress. Fortunately, there is also a great advantage which can give hope for the future: this is the peaceful cooperation of the scientists from all over the world. There can be no doubt that the international cooperation of the scientists can lead to a much better understanding of people from foreign countries than politics and economics ever can do.

May I finally address the colleagues from the other countries: days of interesting work are waiting for us. But let us also enjoy this wonderful country which is full of beauties and mysteries and which has a fine old tradition in spirits and way of life. Addressing also the Japanese colleagues: we want to thank you again as you are kindly our hosts. Please keep on your fine old tradition for which your country is famous everywhere in the world. On the other hand, if we foreigners make some mistakes in these days as we are not very familiar with the fine style of Japanese life, please forgive us. Thank you all very much.